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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/935,158	08/23/2001	Jang-Kun Song	06192.0203.NPUS00	9225

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McGuire Woods LLP
1750 Tysons Boulevard
Suite 1800
McLean, VA 22102-4215

EXAMINER	
RICHARDS, N DREW	

ART UNIT	PAPER NUMBER
2815	

DATE MAILED: 03/09/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/935,158	SONG, JANG-KUN	
	Examiner	Art Unit	
	N. Drew Richards	2815	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *09 December 2003*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-23* is/are pending in the application.

4a) Of the above claim(s) *10-12* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,2,6-8 and 13-23* is/are rejected.

7)☐ Claim(s) *3-5 and 9* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *23 August 2001* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Terminal Disclaimer

1. The terminal disclaimer filed on 12/9/03 disclaiming the terminal portion of any patent granted on this application which would extend beyond the expiration date of copending application No. 10/217977 and copending application No. 10/036305 has been reviewed and is accepted. The terminal disclaimer has been recorded. The terminal disclaimed overcomes the previously applied double patenting rejections.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claim 6 recites the limitation "the curved portions" in line 11. There is insufficient antecedent basis for this limitation in the claim.

4. Claim 15 recites the limitation "the data line" in lines 2 and 3. There is insufficient antecedent basis for this limitation in the claim.

Claim Rejections - 35 USC § 102

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –

> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

6. Claims 1 and 13-22 are rejected under 35 U.S.C. 102(e) as being anticipated by Ikeda (U.S. Patent No. 6,172,729 B1).

With regard to claim 1, Ikeda discloses an LCD in figures 1-10 and on columns 1-8, the LCD comprising:

a plurality of first wires (12l,12m,12n) formed on a substrate and extending in a first direction (figure 6A, though the substrate is not shown column 2 lines 29-30 state that figure 6a shows a substrate, thus the wires are formed on the substrate);

a plurality of second wires (11k,11l,11m,11n) intersecting and insulated from the first wires (12l,12m,12n) and extending in a second direction, wherein each of two neighboring second wires has a bent portion that increases or decreases the gap between neighboring second wires (as seen in figure 6A neighboring second wires 11m and 11n, for example, have bent portions that provide a smaller and larger gap between them); and

a plurality of pixel electrodes (13mR,13mG,13mB,13nR,13nG,13nB) formed in pixel regions defined by the first wires and the second wires, each having a shape conformal to the bent portion of the second wires and comprising a wide portion and a narrow portion (as seen in figure 6A the pixel electrodes conform to the bends in the second wires and have a wide lower portion and a narrow upper portion).

With regard to claim 13, Ikeda discloses in figure 6A an LCD comprising:

a plurality of first wires (12l,12m,12n) formed on a substrate extending in a first direction; and

a plurality of second wires (11k,11l,11m,11n) intersecting the first wires, wherein each second wire has a plurality of bending points.

With regard to claim 14, as shown in figure 6A, the plurality of bending points are arranged periodically.

With regard to claim 15, as shown in figure 6A, the plurality of bending points comprise a plurality of first bending points bending the data line (11k,11l,11m,11n) to extend in a second direction and a plurality of second bending point bending the data line to extend in a third direction.

With regard to claim 16, as shown in figure 6A, the plurality of first bending points and the plurality of second bending points are arranged alternately.

With regard to claim 17, as shown in figure 6A, the second direction and the third direction are different.

With regard to claim 18, as shown in figure 6A, one of the second direction and the third direction is perpendicular to the first direction.

With regard to claim 19, as shown in figure 6A, the plurality of second wires comprises:

a first line 11m having the first bending points and the second bending points arranged alternately; and

a second line 11n neighboring the first line and having the first bending points and the second bending points arranged alternately,

wherein the first bending points of the first line are arranged corresponding to the second bending points of the second line, and the second bending points of the first line are arranged corresponding to the first bending points of the second line.

With regard to claim 20, as shown in figure 6A, each second wire has one first bending point and one second bending point between two neighboring first wires.

With regard to claim 21, Ikeda discloses in figure 6A an LCD comprising:

a plurality of first wires (12l,12m,12n) formed on a substrate extending in a first direction;

a plurality of second wires (11k,11l,11m,11n) intersecting the first wires, wherein each second wire has a plurality of bending points;

a plurality of pixel regions defined by crossings of the first wires and second wires; and

a plurality of pixel electrodes (13mR,13mG,13mB,13nR,13nG,13nB) formed on the first substrate, each pixel electrode formed in the corresponding pixel region and having a shape conformal to the bending points of the corresponding second wires.

With regard to claim 22, as shown in figure 6A, each pixel electrode (13mR,13mG,13mB,13nR,13nG,13nB) has an aperture or a protrusion thereon (the narrow portion at the top of the pixel electrodes is considered a protrusion).

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

8. Claims 6 and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ikeda (U.S. Patent No. 6,172,729 B1).

With regard to claim 6, Ikeda teaches a liquid crystal display (LCD) in figure 6A, for example. Ikeda does not explicitly teach the display of figure 6A being formed on an insulating substrate. However, this limitation is considered obvious as it is well known in the art at the time of the invention to form LCD pixels and circuitry on insulating substrates such that they may be formed on flexible plastic substrates and may be formed on a large area not commonly achievable with a silicon substrate, thus allowing flexibility in device use and allowing the device to be formed to large dimensions.

Ikeda then teaches a plurality of gate lines (12l,12m,12n) on the substrate and a plurality of storage capacitance lines (15m,15n) on the substrate.

Ikeda does not explicitly teach a gate insulating layer formed over the gate lines and storage capacitance lines. However, this limitation is inherently taught as figure 6A shows the data lines (11k,11l,11m,11n) above and insulated from the gate lines and storage capacitance lines and one of ordinary skill in the art would recognize that an insulator would be formed to provide proper insulation between the conductive lines to allow proper device operation.

Ikeda also teaches a plurality of data lines (11k,11l,11m,11n) formed over the gate lines (12l,12m,12n) and storage capacitance lines (15m,15n) and intersecting the gate lines (12l,12m,12n) and storage capacitance lines (15m,15n), each of two

neighboring data lines (11k1,11l,11m,11n) having a bent portion that increases or decreases the gap between neighboring data lines (as seen in figure 6A neighboring data lines 11m and 11n, for example, have bent portions that provide a smaller and larger gap between them).

Ikeda does not explicitly teach a passivation layer over the data lines. This limitation if considered obvious as one of ordinary skill in the art would form a passivation layer over the data lines so that the pixel electrodes could be formed on a flat surface spaced above the data lines and gate lines and so that the data lines and gate lines would be protected during formation of the pixel electrode.

Ikeda also teaches a plurality of pixel electrodes (13mR,13mG,13mB,13nB,13nR, 13nG) formed over the data lines and underlying circuitry, each pixel electrode has a shape conformal to the curved (bent) portions of the data lines and comprising a wide portion and a narrow portion (as seen in figure 6A the pixel electrodes conform to the bends in the data lines and have a wide left-side portion and a narrow right-side portion in, for example, pixel electrode 13nG).

With regard to claim 7, two adjacent pixel electrodes are arranged alternatively, changing the positions of the wide portion and the narrow portion. This is seen in figure 6A where pixel electrode 13nG has a wide left-side portion and a narrow right-side portion and adjacent pixel electrode 13mB has a narrow left-side portion and a wide right-side portion.

9. Claims 2 and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ikeda (U.S. Patent No. 6,172,729 B1) as applied to claims 1, 6, 7 and 13-22 above, and further in view of Lee et al. (U.S. Patent No. 6,266,118 B1).

With regards to claims 2 and 8, Ikeda teaches all the limitations of claims 1, 6 and 7 from with 2 and 8 depend, respectively. Ikeda does not teach the pixel electrodes including one or more apertures for dividing the narrow portion following a direction of the second wires (data lines) and one or more second apertures for dividing the wide portion following a direction of the first wires (gate lines).

Lee et al. teach a liquid crystal display comprising first wires, second wires insulated from and intersecting the first wires, and pixel electrodes formed in pixel regions defined by the first wires and second wires, the pixel electrodes having a narrow portion and a wide portion. Lee et al. teach one or more apertures for dividing the narrow portion following a direction of the second wires (data lines) and one or more second apertures for dividing the wide portion following a direction of the first wires (gate lines). This is taught in figure 3, for example.

Ikeda and Lee et al. are combinable because they are from the same field of endeavor. At the time of the invention it would have been obvious to a person of ordinary skill in the art to form the pixel electrode with the first and second apertures as taught by Lee et al. The motivation for doing so is to improve transmittance and aperture ratio and prevent color shift. Therefore, it would have been obvious to combine Ikeda with Lee et al. to obtain the invention of claims 2 and 8.

10. Claim 23 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ikeda (U.S. Patent No. 6,172,729 B1) as applied to claims 1, 6, 7 and 13-22 above, and further in view of Koma (U.S. Patent No. 6,407,794 B1).

Ikeda teaches all the limitations of claims 21 and 22 from which claim 23 depends. Ikeda teaches a second substrate facing the first substrate (not shown, see column 2 lines 39-41, "opposed substrate"). Ikeda does not teach a common electrode formed on the second substrate and having an aperture or a protrusion formed thereon.

Koma teaches a liquid crystal display comprising first wires, second wires intersecting the first wires and pixel electrodes formed on the first substrate (see figure 3). Koma also teach a second substrate 30 facing the first substrate 10 and a common electrode 31 formed on the second substrate and having an aperture 50 or a protrusion formed thereon (see figures 3 and 4).

Ikeda and Koma are combinable because they are from the same field of endeavor. At the time of the invention it would have been obvious to a person of ordinary skill in the art to form a common electrode with an aperture on the second substrate as taught by Koma. The motivation for doing so is to provide an orientation control window thus solving the problem of decreased transmittance and slower response speed (column 3 lines 20- 35). Therefore, it would have been obvious to combine Ikeda with Koma to obtain the invention of claim 23

Allowable Subject Matter

11. Claims 3-5 and 9 objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

12. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to N. Drew Richards whose telephone number is (571)

272-1736. The examiner can normally be reached on M-F 8:00-5:30; Every other Friday off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tom Thomas can be reached on (571) 272-1664. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

NDR

Tom Thomas
Supervisory Patent Examiner
Tel